



EPA Region 4
Biodiesel Workshop
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Biodiesel From Used Kitchen Oil



YORK TECHNICAL COLLEGE



BIODIESEL PROCESS INPUTS

1. 100 gallons Used Vegetable Oil
2. 20 gallons Methanol (manufacturing byproduct)
3. 10.35 lbs. (4720 grams) Potassium Hydroxide (KOH)
4. 12.86 oz.(380 ml) Sulfuric Acid

Waste Products

1. 20 gallons Glycerin (recycled)
2. Breeding (composted)

**Cost to Produce: \$.84 per gallon when purchasing methanol
 \$.24 per gallon using waste methanol**

What needs to be considered beyond the processing equipment

- Space requirements
- Safety
 - Grounding
 - Ventilation
 - Temperature
- Used Oil Collection System
 - Truck, pumps and hoses
 - Storage – both used oil and biodiesel
- Quality testing
- Labor

Original Location – 240 Sq ft



Current Location – 2400 Sq ft



Safety

Grounding



Ventilation & Temperature



Collection

Used Oil Collection



Collection Drums



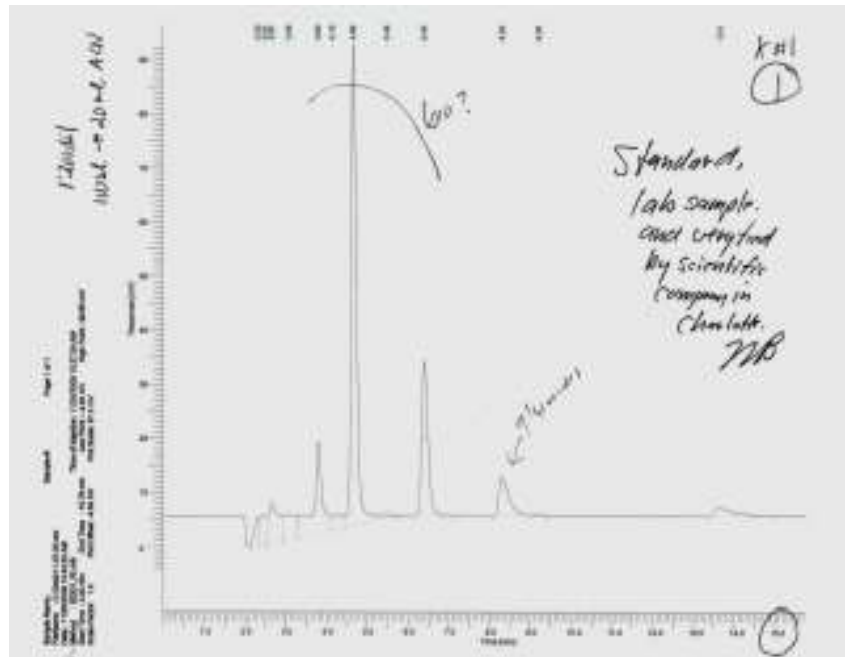
College Programs

- 1. Environmental Science Certificate (28 credit hours)**
 - **Organic and Biochemistry**
 - **Environmental Science**
 - **Water and Wastewater Treatment**

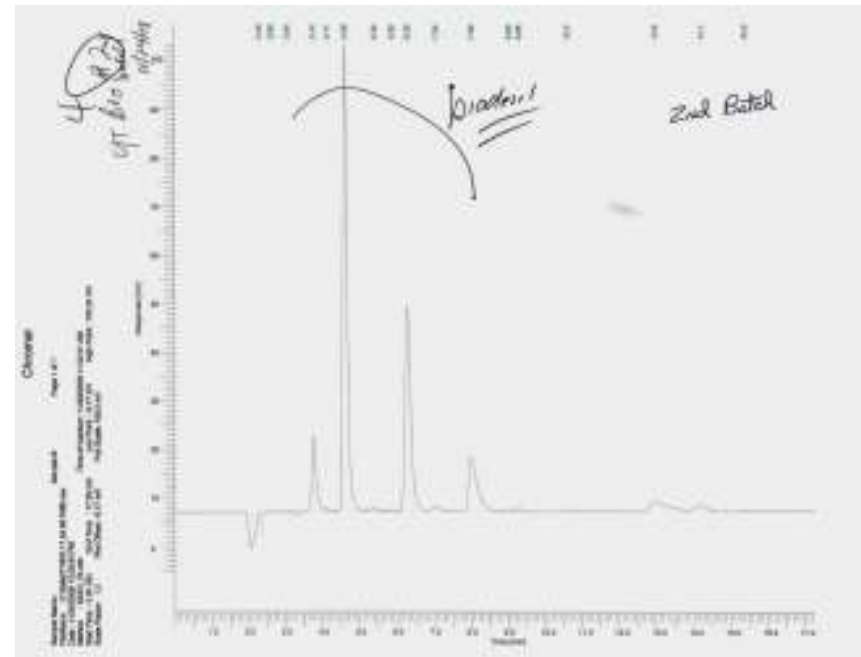
- 2. Analytical Chemistry Certificate (23 credit hours)**
 - **Analytical Chemistry**
 - **Modern Chemical Analysis**

High Pressure Liquid Chromatography (HPLC)

Baseline Chromatograph



Using Waste Methanol



Benefits of Biodiesel

- Less air pollution
- Removing waste material from the waste stream
- Cost Savings
- Educational track
- People want to help the environment



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Questions?

**AVERAGE BIODIESEL EMISSIONS COMPARED TO CONVENTIONAL DIESEL,
ACCORDING TO EPA**

Emission Type	B100	B20
<u>Regulated</u>		
Total Unburned Hydrocarbons	-67%	-20%
Carbon Monoxide	-48%	-12%
Particulate Matter	-47%	-12%
Nox	+10%	+2% to -2%
<u>Non-Regulated</u>		
Sulfates	-100%	-20%*
PAH (Polycyclic Aromatic Hydrocarbons)**	-80%	-13%
nPAH (nitrated PAH's)**	-90%	-50%***
Ozone potential of speciated HC	-50%	-10%

* Estimated from B100 result

** Average reduction across all compounds measured

*** 2-nitrofluorene results were within test method variability